mixed tumors collected from 27 hospitals, concludes:

"That 21.5 per cent recurred. Recurrences have been reported as late as 47 years after removal."

"There is no metastases and nothing happens unless there be traumatic injury to bring about ulceration, haemorrhage, or infection. Such being the case, there is no need for prompt surgical intervention, for the excission is too apt to be followed by facial palsy, which is a more distressing matter than a lump on the cheek."

Another matter of importance and one in which mixed tumors seem to differ in that recurrence is more frequent when the tumor removed is small.

It appears from McFarland's conclusions, though he does not so conclude, that once a diagnosis of mixed tumor is made, any recurrence following its removal warrants complete extirpation of the gland regardless of the ensuing facial palsy. Those are the opinions of the majority of skilled tumor surgeons.

OTHER TYPES

Carcinoma or sarcoma of the salivary glands is rare. They arise in the adult parenchyma, as distinguished from the mixed tumor, which obtains its origin in extra-parenchymal tissue.

The diagnosis features in its main a small hard lump, generally arising in the parotid of an adult usually over forty. It is painful, fixed, grows rapidly, and displays infiltrating characteristics early. They also have a tendency to distant metastases, e.g., to the lungs and bones, as distinguished from mixed tumors, which are locally malignant. In the benign group, the adenoma and lipoma cannot be distinguished from the mixed tumor except microscopically. They are rare diseases.

The most frequent benign tumor involving the parotid is the haemangioma. It is seen at birth or very soon thereafter. The diagnosis is simple, as the haemorrhagic tumor appears only in children. The contents of the tumor can be expressed, which, of course, immediately refills when pressure is released.

Lymphangiomata.—Lymphangiomata occur less frequently, and are distinguished by their color, and the inability to empty them by pressure.

Treatment is by excision or radiation.

Ranula is a submucuous cystic swelling taking origin in the sublingual gland division. It appears in the floor of the mouth anteriorly, and may attain large enough proportions to interfere with movements of the tongue.

Mickulicz's Disease.—Mickulicz's disease proper consists in the symmetrical, painless, non-inflammatory enlargement of the lacrimal glands and one or more pair of salivary glands. There is no involvement of the lymphatic system or alteration of the blood. The general health of the patient is good. The histology is that of lymphocytic infiltration.

Treatment by radiation has been very successful.

Mickulicz's disease proper should be distinguished from Mickulicz's syndrome, in which the enlargement of the glands is due to some other well-defined disease, such as leukemia, syphilis, tuberculosis, Hodgkins, or lymphosarcoma.

In conclusion, I daresay that diseases of the salivary glands make up a larger proportion of otolaryngological practice than is realized. Affections of the salivary glands deserve more space in the literature devoted to otolaryngology.

725 Fourth Street.

VARICOSE VEINS: A SUGGESTED OPERATIVE PROCEDURE*

AN OPERATION FOR VARICOSE VEINS BASED ON ANATOMICAL STUDIES OF INCOMPETENT THIGH PERFORATORS

R. Stanton Sherman, M. D.
San Francisco

MUCH as recent advances have improved the diagnosis and treatment of varicose veins, it is still not possible to obtain ideal results in a considerable number of cases because the diagnostic methods available are not precise enough to disclose the exact location of all incompetent or potentially incompetent perforator veins. Although the ligation and division of the main saphenous vein and its branches at the sapheno-femoral junction are well standardized, the destruction of the perforator veins of the midthigh is often unsatisfactory because, as usually employed, it depends on a blind searching which often fails to produce the desired results.

Because these deficiencies in diagnosis and therapy of incompetent thigh perforators were frequently observed, studies were made on one hundred and twenty-eight patients who had had long saphenous vein ligations combined with retrograde injections of a sclerosing solution. The results of these are shown in Table A. It is to be noted that, while much improvement was obtained by 53 per cent of patients, in 47 per cent the procedure left much to be desired. Indeed, in many cases, the failure was so obvious that further operative therapy was necessary.

The fact that the elimination of incompetent thigh perforators is often inadequate led me to make further anatomical studies on nineteen cadavers, which disclosed some interesting and hitherto undescribed anatomical findings. This led me to alter the surgical technique employed in the treatment of varicosities.

ANATOMICAL STUDIES

The perforator veins connecting the saphenous and the femoral systems are quite variable in number and in location. Nevertheless, there are certain rules which nearly always apply. For

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From the Division on Surgery, University of California Medical School.

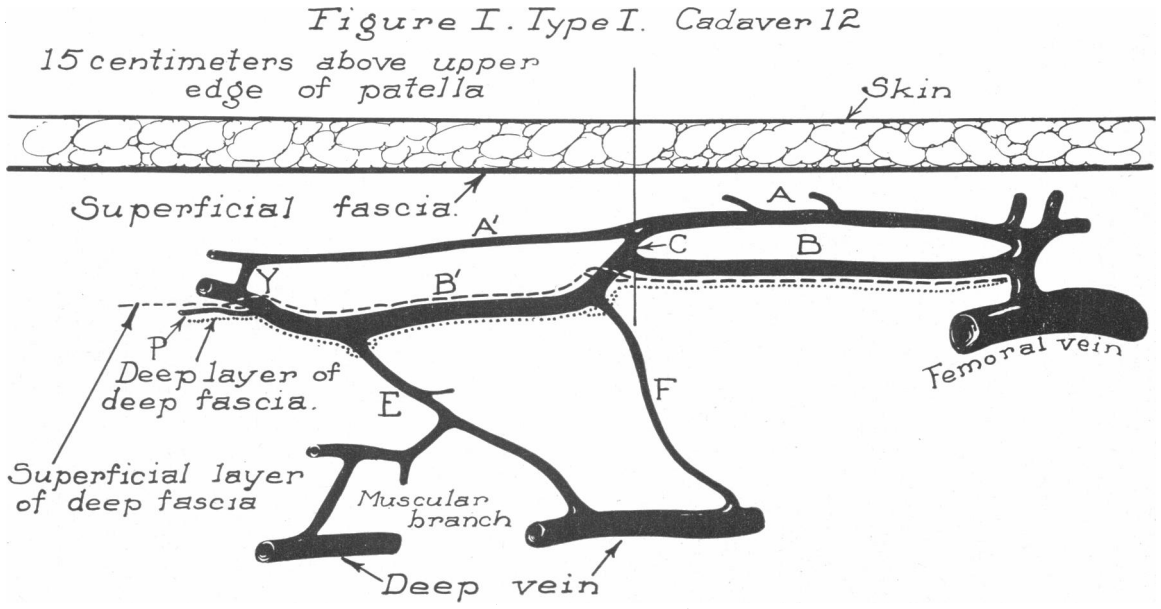

Fig. 1.—Type I: From Cadaver Dissection. The main stems of the saphenous system are shown as AA' and BB'. Note that proximal to connector Vein C, Vein B lies superficial to the superficial layer of the deep fascia, and that distal to Vein C, Vein B' lies between the fascial layers. Perforator veins are shown coming off from Vein B'.

example, the sapheno-femoral junction in the groin is a constant finding. Moreover, there appears to be a basic pattern in the development of the long saphenous stem which is subject to minor variations, and which in large part governs the location of the thigh perforator veins. According to my studies the common embryonic pattern of the saphenous system appears to consist of two saphenous stems in the thigh (Type I, Fig. 1), and while both of these veins are found in the expected location superficial to the deep fascia in the upper thigh, the main saphenous vein pierces the superficial layer of the deep fascia in the midthigh area, whereas the accessory vein remains superficial throughout its entire course (A, A'). The vein which runs beneath the superficial layer of the deep fascia (B') assumes great importance, because it is from this vein

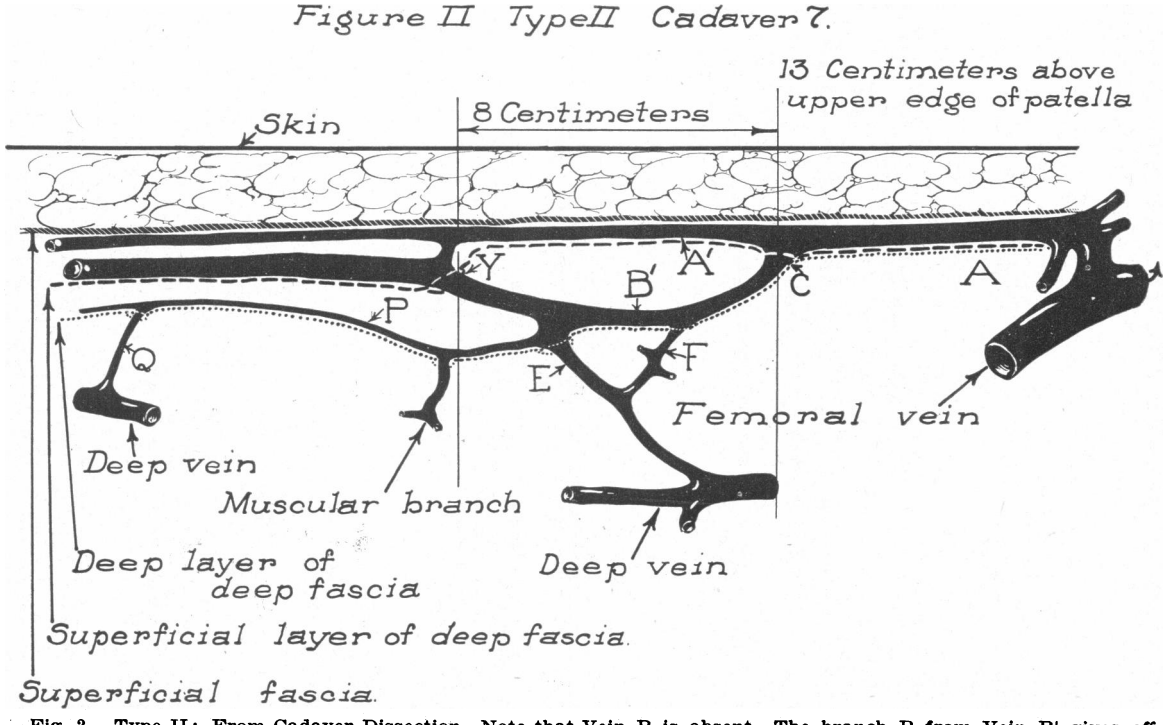

Fig. 2.—Type II: From Cadaver Dissection. Note that Vein B is absent. The branch P from Vein B' gives off an additional perforator vein (Q).

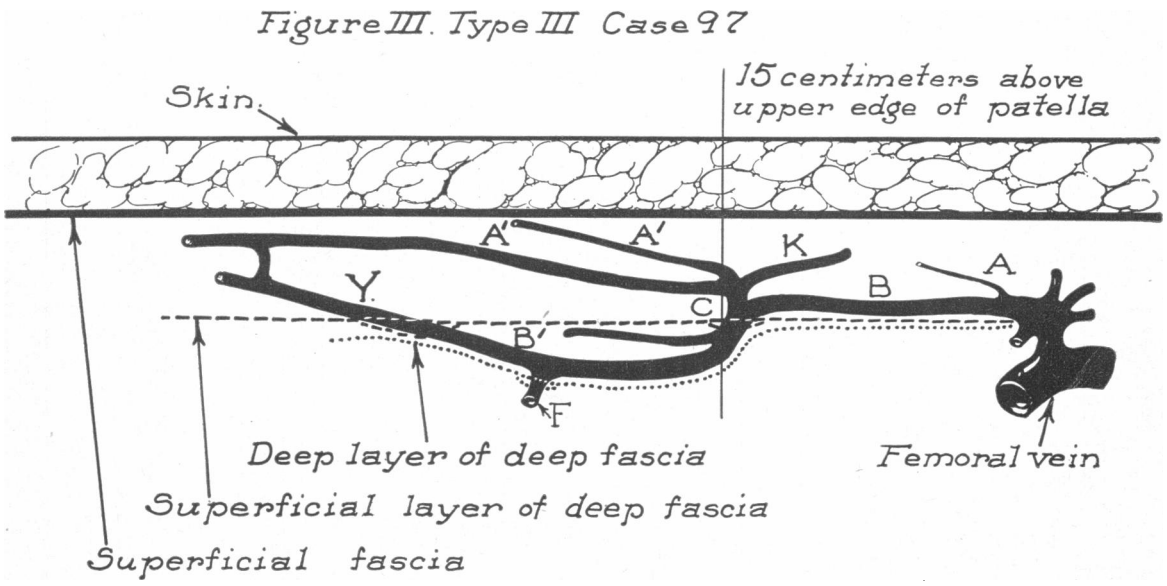

Fig. 3.—Type III: From Surgical Dissection. Note that Vein A is rudimentary.

that the main perforator branches which connect with the deep veins of the thigh arise (E, F). After coursing down the leg for five or more centimeters this saphenous vein usually branches again. One branch emerges from beneath the superficial layer of the deep fascia (Y) to reoccupy its position superficial to the deep fascia, while the other branch (P) continues down the thigh and leg between the deep fascial layers. Despite careful search of the anatomical text books and the literature of this subject, no mention of this relationship of the saphenous vein to the deep fascial layers has been found; yet, obviously, utilization of this knowledge would do much to improve the treatment of thigh perforator deficiencies. Figure 5 shows the relationship of the two saphenous stems to the superficial layer of the deep fascia in the fetus.

From a study of nineteen cadavers and over one hundred operative cases, it appears that this general pattern shows three variations in type (Type II, III, IV). Type II (Fig. 2) is the same as Type I, except that Vein B is absent. Type III (Fig. 3) is also the same except that Vein A is absent. Type IV (Fig. 4) is again like Type I, except for the apparent absence of Vein A'. No case has been observed in which Vein B' is absent. Any of these veins may be double or even triple, and considerable variation has been observed of the manner in which branches connect them with the deep circulation. The crux of the entire treatment of incompetent thigh perforators depends, therefore, on a full realization of the importance of this pattern, and especially of the rôle played by Vein B'. The elimination of all these veins—A, A', B, B' and P—should prevent reflux flow of blood from the deep veins of the thigh by severing those incompetent veins which communicate between the deep and superficial system.

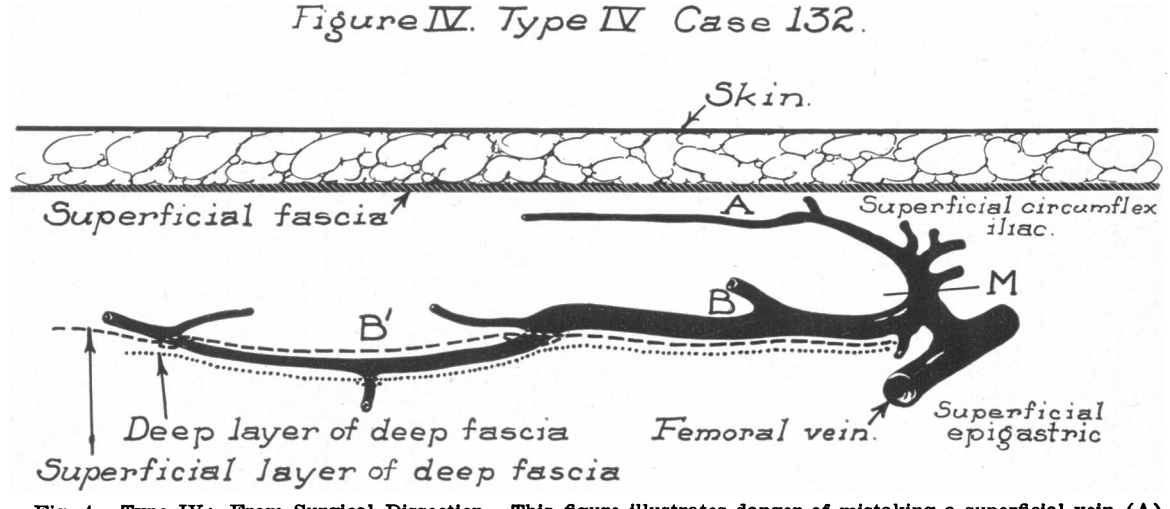

Fig. 4.—Type IV: From Surgical Dissection.—This figure illustrates danger of mistaking a superficial vein (A) for the main saphenous when ligation of the saphenous vein alone is practiced. (See text.)

SURGICAL APPLICATIONS

With the vein arrangement shown in Fig. 1, an ordinary Mayo stripping procedure and ligation of Vein A, would eliminate Vein A and A', and disconnect the upper part of Vein A from the femoral vein; but the Veins B, B', C, E and F would remain open and, if incompetent, would prevent a satisfactory result. If, however, Vein B and B' and Vein C were also excised, one would expect marked improvement because, aside from the ligation of the saphenous vein at the sapheno femoral junction and elimination of Veins A, A', B, B' and C, the Veins E and F would also be severed.

In Fig. 2, another problem is presented. Here the Mayo stripping of Vein A and A' would sever Vein C, but would not eliminate the branches E and F which also connect the deep veins of the leg. However, if Vein C, B' and P were excised by the stripping procedure, branches E, F and Q would be cut across. This would definitely aid in eliminating the reverse flow of blood in the incompetent thigh veins. Thus, it becomes apparent from cadaver dissections, that Vein C and B' are of great importance, for most of the veins connecting with deep system are branches of Vein B'.

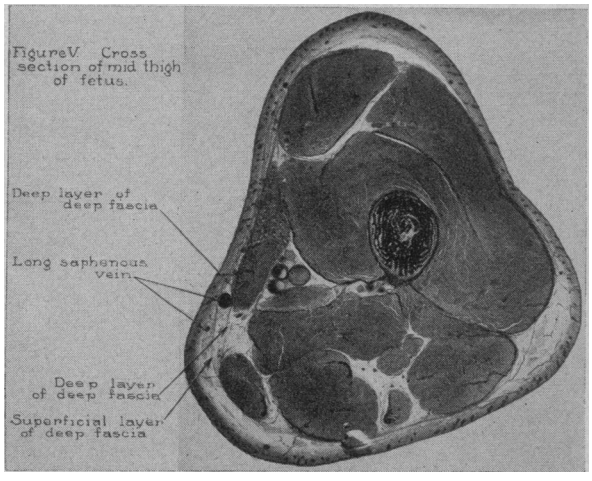

Fig. 5.—Cross Section of Midthigh of Fetus. Note the two stems of the saphenous system which are separated by the superficial layer of the deep fascia.

The surgical approach is based upon the information yielded by the anatomical studies which have just been described, a procedure which, in my hands, has materially improved the results of varicose vein therapy. Moreover, it involves a minimal amount of trauma and has the advantage of keeping patients in bed for only short periods of time. It consists of a combination of vein injection, high saphenous vein ligation and vein stripping. The basically-new approach is the employment of sclerosing solution as an agent for the suppression of hemorrhage from the long saphenous vein and its branches, so that vein stripping can be performed without the danger of postoperative hemorrhage. Patients can be out of bed and active within twenty-four hours. This early activity combined with firm thrombosis of the cut veins also reduces the danger of lung infarcts by emboli.

TABLE A.—*Results of Studies on Cases Treated by High Ligation and Retrograde Injection of Sclerosing Solution*

Total cases examined	128
Total number of legs	190
Number of faulty high ligations	9 legs
Average elapse of time since operation	2.6 years
*Reflux flow of blood in 0—15 sec.	89 legs—47%
*Reflux flow of blood in 16—40 sec.	101 legs—53%
*75—100% improvement	96 legs—51%
*50—75% improvement	44 legs—23%
*Under 50% improvement	50 legs—26%

*Multiple tourniquet test were employed and observations were taken with tourniquet applied at groin, so as to rule out any inaccuracy of the high ligation procedure.

OPERATIVE PROCEDURE

Varices below and slightly above the knee are thoroughly sclerosed by local injection. Under local, spinal, or general anaesthesia the saphenofemoral junction is exposed through a longitudinal incision. When the long saphenous vein is identified, a temporary ligature is applied and the vein is subjected to the retrograde injection of a sclerosing solution. An interval of ten to fifteen minutes is then allowed to elapse, during which time the saphenous vein and its upper branches are exposed, ligated, and divided. This procedure of high ligation of the saphenous vein is now so fully standardized, that comment on this aspect of the operation is unnecessary.[1] At the end of this interval of time, it will be found that the sclerosing solution has caused thrombosis in the affected vessels, which usually prevents bleeding when they are cut across. It is important, however, to test the effectiveness of the sclerosis by releasing the temporary ligature and observing that bleeding does not occur from the open end of the vein. If, in rare instances, bleeding should occur, the vein is again subjected to an injection with sclerosing solution. It may be stated here, that the effectiveness of sclerosis as a hemostatic agent is in direct proportion to the ability of the sclerosing solution to injure the intima of the vein. If, in any case, there is a doubt that the sclerosis effectually suppressed all hemorrhage, the offending vessel should be ligated or, if perchance the bleeding vessel cannot be located, firm bandaging of the leg should control any bleeding.

TABLE B.—*Classification According to Types*

Total cases operated	43
Total number of legs	67
Number of legs, Type I	7
Number of legs, Type II	41
Number of legs, Type III	3
Number of legs, Type IV	16

The next step is the elimination of the thigh perforators. Although Vein C is usually located

within a distance of twelve to twenty centimeters above the upper edge of the patella, its exact position is quite variable. Three procedures have been found helpful in locating it. First, the midthigh area is inspected to ascertain if a dilated bulbous varix is present. If so, Vein C is extremely likely to be near it. Secondly, a small looped Mayo stripper or a Babcock probe may be inserted inside the vein and forced down until obstruction is encountered. Third, a Mayo stripper may be placed outside the vein, the vein being stripped caudally until rather marked resistance is met. (In the latter case, the superficial femoral branches of the saphenous vein must not be confused with Vein C.) Vein C is usually found at this point of resistance. When it is located a longitudinal incision about 7 cm. in length is made over the area. Vein C is identified and separated from Vein A. Once identified, it is simple to ascertain the fact that Vein C pierces the fascia. In fact, in order to strip Vein C and B', it is usually necessary to direct the loop of the Mayo stripper cephalad in order to engage Vein C through the opening in the superficial layer of the deep fascia. Vein A' and Vein C and the latter's continuation B' are then excised by stripping to a point at least ten centimeters below the knee. From operative cases it appears that the Veins P and B' below point E vary in size and importance in different cases (Fig. 2). If one of these is large, the other is usually small. The Mayo stripper tends to follow the larger vein, so that while in some cases the stripper below point Y will run above the superficial layer of the deep fascia, in others it travels under this fascial layer.

Two examples illustrate some of the technical problems encountered. Occasionally, as in Fig. 4, Vein A is found supplying only the upper thigh, and stripping fails to trace it beyond the midthigh, in which event one may expect to find Vein B of substantial size. Here connecting Vein C may exist, but is so small that its identification is impossible. Also it is very important to note that Vein B could easily be mistaken for the femoral vein, and hence, should a ligation be performed as indicated by line M, the procedure would leave Vein B patent and the operative procedure would fail to accomplish its purpose.

Fig. 3, depicts an interesting variation. The pattern of the veins is nearly opposite to that shown in Fig. 2. It is seen that Vein A is only rudimentary. The area usually supplied by Vein A is probably drained by the superficial circumflex iliac above and by the ascending continuation (Vein K) branch of Vein C, below. Vein B descends to a point fifteen centimeters above the upper edge of the patella where it divides into several branches. One of the branches from Vein C immediately divides into three superficial veins. One branch (Vein K) representing Vein A, ascends toward the upper thigh, while two branches (representing Vein A') take a downward course. Incidentally, Vein B' is also represented by two veins, one of which is much smaller than its partner.

DISCUSSION

The recognition of the occurrence of anatomical Types I, II, III and IV has grown, as stated, from observations on over one hundred Mayo stripping operations performed between August 1, 1940 and September 1, 1941, and from dissections of nineteen cadavers. Since these types have been clearly recognized, forty-three additional cases have been operated upon. Their type distribution is shown in Table B. In this preliminary report, no attempt has been made to indicate the late effects of the procedure, since insufficient time has elapsed for proper evaluation. It would appear, however, that the method should reduce the incidence of recurrence. It is interesting that in the entire group of 146 cases no massive hematomas, and no pulmonary embolisms have occurred.

SUMMARY

1. It is shown that a general scheme of arrangement of the saphenous system in the thigh exists and that variations are common.

2. The occurrence of a heretofore unrecognized location of the saphenous vein between deep fascial layers, and of more or less constant connecting veins perforating the deep layer of the deep fascia in the midthigh, is described.

3. Suggestions are made for what appears to be a more effective operative therapy.

4. These anatomical variations seem to be divided into four main types whose surgical significance is emphasized.

516 Sutter Street.

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TYPHUS FEVER IN CALIFORNIA*

WILTON L. HALVERSON, M. D.
Los Angeles

IN his very entertaining and instructive story of typhus fever, which he entitled "Rats, Lice and History," Hans Zinsser quotes from the Cronica Cavense, an Italian manuscript, what is perhaps the earliest known record of typhus fever.

"In the year 1083, in the monastery of La Cava (near Salerno), in the months of August and September, there spread a severe fever with peticuli—and parotid swellings, in which one sees clearly the difference which is found from the Pest, a fever of a different kind and—in this case —accompanied by petechial spots."[1]

Typhus fever is accurately described by Girolamo Fracastoro in his treatise on Communicable Disease, De Contagione, published in 1546. It has played a major rôle in history, and time after time has dictated the outcome of war, not always favoring the strong. The causative agent is Rickettsia prowazeki. There are two forms: the

* Read before the Third General Meeting, at the Seventy-first Annual Session of the California Medical Association, Del Monte, May 3-6, 1942.
From the Los Angeles County Health Department, and the Division on Public Health of College of Medical Evangelists.